Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
NextNav Petition for Rulemaking	)	WT Docket No. 24-240
	)	
	)	

To: Chief, Wireless Telecommunications Bureau
Chief Engineer, Office of Engineering and Technology

COMMENTS OF AICC

Alarm Industry Communications Committee
Sascha Kylau / Tiffany Galarza, Co-Chairs
c/o The Monitoring Association
7918 Jones Branch Drive, Suite 400
McLean, VA 22102
Tel. 703-242-4670

John Prendergast
D. Cary Mitchell
Blooston, Mordkofsky,
Dickens & Prendergast, LLP
2120 L Street, N.W., Suite 825
Washington, D.C. 20037
Tel: 202-659-0830

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SUMMARY

The Alarm Industry Communications Committee ("AICC") urges the FCC to deny the April 16, 2024 Petition for Rulemaking filed by NextNav, Inc. ("NextNav"). NextNav asks the FCC to reconfigure the 902-928 MHz band ("Lower 900 MHz Band") and to grant it a nationwide license for 15 megahertz of spectrum so that it can deploy a terrestrial positioning, navigation, and timing (PNT) network that complements and backs up the U.S. Global Positioning System (GPS), along with expanded rights to repurpose the current shared use spectrum for a high power terrestrial 5G mobile broadband network to support its business plan. AICC strongly objects to the NextNav proposal because it would privatize almost 60% of the Lower 900 MHz band spectrum that is currently used by individuals, families and businesses to carry communications between security and smart home sensors and their alarm systems' control panels. NextNav's proposed high power operations with standard out-of-band emissions limits and unlimited interconnection rights would create a direct risk of harmful interference and channel crowding to the low power Z-Wave alarm devices that help to protect millions of homes and small businesses.

The scope of potential RF interference issues that NextNav's proposal creates for alarm devices and other part 15 devices is broad, and the costs associated with buying and installing replacement devices and systems will be enormous. However, these costs pale in comparison to the potential life safety consequences for users of Lower 900 MHz Band alarm devices. The NextNav proposal will also cause harmful channel crowding for all incumbent Part 15 users, and it is far from certain that millions of devices can be successfully migrated to 2.4 GHz or other unlicensed spectrum bands, which are already highly congested and prone to interference.

A review of the NextNav Petition raises many serious questions about whether its proposal will even work, or whether its business will be successful in a highly competitive marketplace. Once the Lower 900 MHz Band is dismantled pursuant to NextNav's plan, it will be difficult to restore if NextNav's business fails; moreover, substantial harm to consumers, businesses and government users will have already happened. Numerous other GPS backup systems are in the process of being developed and/or implemented that do not involve potential harm to or displacement of hundreds of millions of incumbent users. And since NextNav indicates that it only needs a small portion of the proposed 15 megahertz license for its PNT service, it is unclear what would prevent it from entering into arrangements to deploy its PNT technology using spectrum that has already been licensed to one or more commercial wireless carriers. In any event, by granting such an enormous windfall to one competitor, the Commission could discourage the innovation and competition needed to create the best product at the best price for all public and private users of a PNT service.

Finally, precedent cited by NextNav does not support creation of a nationwide license by a spectrum "swap" outside of the competitive bidding process. Section 309(j) of the Communications Act expresses the intent of Congress that the FCC should not award licenses for a valuable public resource without recovering for the public a significant portion of the value of these licenses.

The Lower 900 MHz band has been carefully crafted by the Commission to accommodate an ecosystem that supports well over a Hundred Million devices, which provide extremely valuable services and capabilities to businesses, government entities and the American consumer. It is respectfully submitted that however laudable the goal, the proposed upheaval of the Lower 900 MHz Band is not justified and would be adverse to the public interest, especially given questions about the viability of NextNav's proposal, and the existence of less disruptive alternatives.

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COMMENTS OF AICC

The Alarm Industry Communications Committee ("AICC"), on behalf of its membership, respectfully submits these comments in response to the April 16, 2024 Petition for Rulemaking filed by NextNav Inc.[1] The NextNav Petition asks the Commission to initiate a proceeding to modify the Location and Monitoring Service (LMS) rules to reconfigure the 902-928 MHz band ("Lower 900 MHz Band"), and grant NextNav a nationwide license for the reconfigured spectrum. Alarm monitoring companies and alarm equipment manufacturers must object to NextNav's proposal because it would privatize a significant part (15 out of 26 megahertz, or 58%) of the Lower 900 MHz band spectrum that is currently used by individuals, families and businesses to carry communications between security and smart home sensors and their alarm systems' control panels. Americans have invested in Part 15 devices to protect their premises, and security companies have incorporated these devices into their overall system architecture. Privatizing this spectrum would result in crowding of the shared use operations and degraded reliability and performance for Part 15 devices, including alarm systems and other low power 900 MHz radio devices that provide important services to consumers. The alarm system-connected devices are used to collect important data from a protected premise and, in emergencies, relay this information to police, fire, emergency medical services, and other first responders. NextNav's proposed high power operations with standard out-of-band-emissions limits would create an additional significant interference risk for operators that remain in the Lower 900 MHz band, resulting in substantial economic harm to alarm companies and their customers that could be forced to scrap equipment that is highly reliable, cost-effective, and that could otherwise be expected to continue providing quality service for many years to come. AICC appreciates the efforts of NextNav toward development of technology to back up GPS; and AICC understands the drive to develop a creative way to advance deployment of such technology. However, the Lower 900 MHz band has been carefully crafted by the Commission to accommodate an ecosystem that supports well over a Hundred Million devices, which provide extremely valuable services and capabilities to businesses, government entities and the American consumer. It is respectfully submitted that however laudable the goal, the proposed upheaval of the Lower 900 MHz Band is not justified and would be adverse to the public interest, especially given questions about the viability of NextNav's proposal, and the existence of less disruptive alternatives.

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[1] *See* Petition for Rulemaking of NextNav Inc., WT Docket No. 24-240, RM-11989, *filed* April 16, 2024, ("NextNav Petition" or "Petition"). NextNav also filed a supplement proposing specific part 90 rule revisions. Letter from Robert Lantz, General Counsel, NextNav Inc., to Marlene H. Dortch, Secretary, FCC (filed June 7, 2024) ("NextNav Supplement to Petition").

I. Statement of Interest

AICC is a committee formed by The Monitoring Association (TMA) (formerly the Central Station Alarm Association) to address alarm industry issues through input from the industry's stakeholders. AICC represents the vast majority of entities providing central station alarm security protection services approved by Underwriters Laboratories, Factory Mutual, Intertek and similar agencies. The Electronic Security Association (ESA) (representing security and fire alarm service providers) and the Security Industry Association (SIA) (representing alarm system manufacturers) are important members of AICC. AICC and TMA help to develop standards for the security industry when it comes to equipment and practices.

AICC's members fulfill a fundamental spectrum use goal articulated by the Communications Act of 1934, as amended (the "Act"). These companies and associations are dedicated solely to "promoting the safety of life and property through the use of wire and radio communication." Central station alarm operations protect tens of millions of families in their homes; and alarm companies provide medical alert services for monitoring the elderly and those with health conditions. AICC member companies protect a wide range of sensitive facilities and their occupants from fire, burglaries, sabotage, carbon monoxide poisoning and other emergencies. Protected facilities include government offices, military installations, power plants, hospitals, dam and water authorities, pharmaceutical plants, chemical plants, banks, schools and universities. In this regard, the alarm industry works hand in hand with the public safety community to focus government resources on actual, verified emergency situations. AICC's member companies routinely install alarm monitoring systems that rely on unlicensed component devices operating in the 902-928 MHz band, operating successfully under the current Lower 900 MHz Band rules set up by the Commission. These integral component devices are primarily used for alarm point detection within the premises, such as door and window motion, glass breakage, and smoke detecting sensors, as well as wireless panic buttons.[2] They also include user control devices such as key fobs or wireless keypads that can be used to arm/disarm an alarm system or activate a panic button in the event of an emergency.

The security industry depends on high reliability communication. Security systems protect not only property but also life safety. Failure of sensor signals to be properly transmitted and received in such a moment could have catastrophic consequences. If an unlicensed device is unable to signal the detection of smoke, a fire could spread rapidly and trap residents inside the burning premises. If an unlicensed device cannot relay warning of dangerous carbon monoxide levels, lives will be put at risk.

II. The NextNav Proposal

In its Petition, NextNav, a for-profit entity, proposes wholesale changes to the Lower 900 MHz Band and LMS rules. NextNav proposes these changes because it is asking the Commission to grant it a nationwide license for 15 MHz of spectrum to be carved from the Lower 900 MHz Band, so that it can deploy a terrestrial positioning, navigation, and timing (PNT) network that complements and backs up the U.S. Global Positioning System (GPS), as well as a terrestrial 5G mobile broadband network.

In particular, NextNav (parent company of M-LMS licensee Progeny LMS, LLC) is asking the Commission to reconfigure the Lower 900 MHz Band by creating a 5-megahertz uplink in the 902-907 MHz band paired with a 10-megahertz downlink in the 918-928 MHz band. NextNav merely speculates that Part 15 devices should be able to adapt to the changed RF environment created by its proposal. It provides no empirical evidence that Part 15 devices will in fact be able to coexist with the proposed NextNav system, or that they will be able to "adapt" to utilize a much smaller portion of the Lower 900 MHz band and a significantly more crowded operating environment. Careful technical analysis of this issue is needed, coupled with comprehensive testing.

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[2] Examples include Inovonics 900MHz Wireless Glass Break Alarm transmitters; BEC 900 MHz Wireless Location Device for Panic Buttons; DSC Alarm Pc5132-rs Us 900mhz Wireless Interface Module; and Alarm Grid DW10E-900 - Door & Window Alarm Sensors.

On August 6, 2024, the Commission released a Public Notice (DA 24-776), asking several important questions about the NextNav proposal. AICC is addressing the Commission's questions that are most relevant to the impact on alarm and other Part 15 operations, when discussing its concerns about the NextNav Petition below.

III. Millions of Alarm Systems and Other Devices That Rely Upon Shared Access to Lower 900 MHz Band Spectrum Would be Jeopardized by the NextNav Proposal

PN Questions addressed:

We seek comment on the extent of part 15 devices and amateur operations in the band and what potential impact band reconfiguration and flexible use rules, including elimination of the testing requirements of current rule section 90.353(d),30 might have on part 15 devices and on the amateur community.

What services are being provided by part 15 devices and amateur operations in this band?

If the NextNav proposal is implemented, it can be expected to gut the Lower 900 MHz band ecosystem of millions of diverse services and devices that has been fostered by the Commission over the past several decades.

A. Scope of the Problem

What services are being provided by part 15 devices and amateur operations in this band?

A substantial portion of Part 15 devices used in the Lower 900 MHz band are those using Z-Wave technology. The Z-Wave protocol is is primarily used for home automation, but is also used by the alarm industry. It operates in North America using low power signals in the 908 MHz portion of the Lower 900 MHz band (i.e., right next to the portion of the band on which NextNav proposes to conduct high power operations). The technology is developed and promoted by the Z-Wave Alliance, which includes over 300 companies that produce Z-Wave certified devices. There are more than 4,500 products on the market today; and approximately 35 million homes utilize these products.[3] Z-Wave is widely used in smart home and business devices, especially for security, lighting, climate control and access control. Millions of homes and small businesses are protected using Z-Wave alarm devices and systems.

Z-Wave technology enables comprehensive home automation and security solutions that integrate seamlessly with various smart home devices such as door locks, motion sensors and cameras. Z-Wave's interoperability ensures that devices from various manufacturers can work together within the same network, while preserving advanced security features like encrypted communication and secure inclusion, which help protect the system from unauthorized access. However, these benefits may be lost or significantly degraded if the Commission were to modify its M-LMS service and technical rules to "align with the Commission's flexible-use rules (e.g. Part 27) for mobile and/or fixed broadband operations, including full macro power limits and standard out-of-band-emissions limits," as NextNav has proposed.[4]

Z-Wave alarm systems and other Part 15 devices were developed and designed to operate within a carefully crafted shared-use spectrum environment that has proven to be extraordinarily successful.[5] For the most part, Z-Wave devices do not use spread spectrum (or frequency hopping) technology. These devices are not designed to withstand interference from fixed and/or mobile devices operating at commercial macro power limits and out-of-band emission limits on proximate channels.

While other unlicensed spectrum bands have become available for use since 1995, the number and diversity of users in the Lower 900 MHz Band – including Z-Wave technology which was developed in 1999 – has grown exponentially. The Z-Wave Alliance has advised AICC that there are *more than One Hundred Million* Z-Wave devices in use. That is over and above the numerous devices using other types of technologies in the Lower 900 MHz band. Thus, contrary to the assertion in the NextNav Petition (at p. 2), the band is not "underutilized".

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[3] Z-Wave Alliance, "Learn about Z-Wave Technology" (Retrieved from https://z-wavealliance.org/).

[4] *NextNav Petition* at p. 29.

[5] https://ieeexplore.ieee.org/document/1428985 ("Recently there has been a significant increase in the number of unlicensed devices or what is often referred to as 'part 15 devices'. The type and application of these devices is developing at a very rapid pace. The FCC rules have been very successful in permitting the development and use of new types of unlicensed devices.")

The Part 15 devices used in alarm protection systems literally help to save lives and property, thereby providing a vital service to the public. As noted above, the Part 15 sensors used in alarm technology help detect and relay signals of smoke detection, glass breakage, and other conditions that can signal the presence of fire, home invasion, dangerous carbon monoxide levels and other life-threatening emergencies. Access control signals allow consumers to more quickly enter their homes or vehicles, enhancing their safety, and secure their homes if they have forgotten to lock a door when leaving. Alarm companies also use radio frequency identification (RFID) to track valuable cargo; to help hospitals, schools, and government facilities track authorized ingress and egress; and to help track their security guard force, for their safety and to better coordinate a guard response to a potentially hazardous situation.[6]

Z-Wave devices provide other important services that help ensure the efficient and effective operation of utilities, businesses and governmental entities that have important implications for consumers. Such services include:[7]

- Medical devices
- power meters and smart grid home monitors
- Public safety devices, such as parole location devices

B. The NextNav Proposal Will Likely Cause Harmful Interference to Incumbent Part 15 Users and Others in the Lower 900 MHz Band

We seek comment on NextNav's proposed "provisional" rules. Do they provide sufficient protection for incumbent operations while enabling the proposed PNT services and contemplated broadband operations by wireless providers, however authorized?

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[6] RFID ID tags manufactured by the alarm industry are also widely used in the retail sector to protect goods from theft. Should these sensors not function as designed due to interference from NextNav's proposed network, retailers would be forced to raise the cost of goods overall, which would detrimentally impact all consumers.

[7] *See* In the Matter of Request by Progeny LMS, LLC for Waiver of Certain Multilateration Location and Monitoring Service Rules, WT Docket No. 11-49, Reply Comments of the Alarm Industry Communications Committee (*filed* Jan. 11, 2013), at p. 4, *citing to* Comments of the Part 15 Coalition (*filed* Dec. 21, 2012) at pp. 3-4; *see also* Z-Wave Alliance web site at https://z-wavealliance.org/.

> *We seek comment on the extent of part 15 devices and amateur operations in the band, and what potential impact band reconfiguration and flexible rules, including elimination of the testing requirements of current rule section 90.353(d), might have on part 15 devices and on the amateur community.*

AICC has reviewed NextNav's proposal with its members and has determined that there will be a high likelihood of harmful interference caused to Lower 900 MHz Band Part 15 devices, including alarm systems that rely on this technology. This determination is based on four factors:

1. **Stripping of interference protection**: Of greatest concern, NextNav proposes that it be granted relief from rules that were adopted to facilitate the co-existence of M-LMS operations and Part 15 devices in the 902-928 MHz band. In particular, the Commission adopted a safe harbor rule for unlicensed devices and amateur operations in the band and required that M-LMS licensees demonstrate through actual field tests that "their systems do not cause unacceptable levels of interference to Part 15 devices."[8] In proposed Rule Section 90.1410(c), NextNav would eliminate any interference protection and testing requirements for Part 15 devices.

2. **Unlimited interconnection rights**: NextNav is not just seeking to provide PNT service on its proposed nationwide license. At page 29 of its Petition, NextNav asks the Commission to allow it unrestricted interconnection with the public switched network, so it can provide broadband services. If NextNav can have unrestricted real time interconnection, it would allow unlimited two-way channel usage for long periods of time which may prevent low power unlicensed communications from being delivered in a timely fashion. Indeed, if NextNav's spectrum can be used for broadband as well as voice, then viewing video content and long internet searches are likely to make co-existence with Part 15 devices unworkable – especially for alarm sensor and wireless panic button signals that simply cannot be delayed.

3. **Dramatic increase in permitted power**: NextNav also proposes rule changes that would allow it to operate with a power level of up to 1000 watts/MHz effective

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[8] *See* Rule Section 90.353(d).

radiated power (ERP) (up to 2000 watts/MHz ERP in rural areas). And in proposed Rule Section 90.1408, NextNav seeks the ability to mount its antennas as high as 4000 feet above average terrain (AAT). AICC has determined that certain alarm devices operate in the portion of the 900 MHz band that NextNav would occupy for its high-power operations.

4. **Sidelobe interference**: AICC notes that the proposed alignment of NextNav's proposed 15 MHz license band for commercial mobile and fixed broadband services may adversely affect the Lower 900 MHz band at shoulder frequencies of 907 and 918 MHz, due to sidelobes. NextNav is asking to be able to use Part 27 out of band emission limits for its high-powered operations. AICC estimates that this sidelobe interference issue may shrink the "leftover" 900 MHz band from 11 megahertz to only 9 megahertz. Any sidelobe from these operations at the 907 MHz portion band is likely to cause harmful interference to 908 MHz, which is where most Z-Wave devices operate.

Alarm device manufacturer DMP has confirmed that the current 900 MHz sharing scheme has allowed its spread spectrum wireless sensors to function exceedingly well for more than two decades. By providing and maintaining the spread spectrum rules of the road, the Commission is providing a much more efficient use of spectrum than allocating bands for a limited product set or individual company. In contrast, DMP notes that if the NextNav proposal is adopted, it could have disastrous consequences for security systems installed to protect businesses and individuals. By way of example, more than 100,000 bank branch locations are currently protected by DMP sensors using this spectrum, as well as certain aspects of the executive protection provided by the United States Secret Service at the highest levels. There are many more examples.

AICC has also identified concerns related to life safety devices that are using the Lower 900 MHz band frequencies for both fire detection and notification within the protected premises, as well as offsite reporting to the supervising station. In the marketplace there are products listening to specific sound patterns which trigger a local alarm notification. The household fire alarm system will then transmit a notification signal to the supervising station. Adverse consequences can include the following results: improper triggering of devices within the protected premise, and interference to supervision integrity.

Another alarm manufacturer and AICC member utilizes proprietary technology in the Lower 900 MHz Band in products for life safety and security applications. Its customers have deployed tens of millions of wireless sensors, detectors and other devices to equip homes and businesses with fire and other life safety capabilities. Additional applications include intrusion protection via smart security systems, door locks, medical sensors, and sensors that detect water leaks. In addition to serving residential customers, these products are used by school boards, government entities, and other high security installations. Devices are designed to co-exist in the 900 MHz band whereby all users restrict their power and power density. Because the technology is programmed to operate in the upper part of the band, through 919.25 MHz, the NextNav proposal would cause band overlap in frequencies leading to greater co-channel interference. This member has also indicated that the channel crowding that would be caused to all Part 15 devices in the band will cause degradation of performance in already installed devices, which can lead to disruption of existing services in key areas such as fire detection, monitoring and security among others.

Honeywell International Inc. (Honeywell) utilizes the 902-928 GHz band for critical fire and life safety devices, such as wireless smoke detection systems. First launched in 2014, Honeywell's Smart Wireless Integrated Fire Technology (or SWIFT™) wireless fire and in-building notification system operates on a mesh network and utilizes frequency hopping to ensure reliable communication. These systems are designed for both indoor and outdoor use, including at temporary construction sites, where traditional wired systems may be impractical. Hundreds of thousands of SWIFT™ units are deployed across tens of thousands of installations by independent contractors in the United States. A Lower 900 MHz band restructuring that eliminates more than 60% of the shared spectrum that these devices use to operate would significantly disrupt the current ecosystem and could result in the loss of fire protection for an occupied building or work site, compromising the effectiveness of these life-saving devices and putting lives and property at risk. Moreover, restricting Lower 900 MHz band access could lead to increased costs for consumers and businesses needing to replace or upgrade their equipment.

Aside from millions of alarm devices and smart home sensors, toll collection systems that utilize Lower 900 MHz Band channels like EZ Pass have tens of millions of toll transponders in use in the United States which collect billions in annual toll revenue.[9] Harmful interference to a highly successful toll interoperability network would have negative impact on facilities operated by dozens of agencies in 17 states that rely upon electronic toll collection. Millions of consumers and businesses that rely on the speed and convenience of automated toll collection would be harmed if this system is disrupted.

Despite its proposed rule changes, NextNav downplays the negative consequences, appearing to suggest (at p. 31 of the Petition) that Part 15 devices will be able to operate within the spectrum on which NextNav will conduct its high-power operations:

> Coexistence between the NextGen system and unlicensed Part 15 operations should be achievable. Part 15 devices must coexist with one another in addition to other operations in the band. As a result, Part 15 devices need to be robust and adapt to ever-present interference, including mutual Part 15 interference, which is unpredictable by nature.

While Part 15 devices are indeed secondary, they have occupied the Lower 900 MHz band in numbers that exceed 100 million because they have received limited but adequate protection from the existing scheme set forth in Rule Section 90.353(d) and related provisions.[10] Based on that protection, manufacturers and consumers have invested billions of dollars into devices now using the band. But with NextNav's proposed stripping of all protections, and its substantial increase in the power of potentially interfering signals, it is highly unlikely that Part 15 devices will be able to operate free of interference in much of the band.

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[9] *See* EZ Pass Interoperability, EZ Passs Group. https://e-zpassiag.com/85-interoperability/491-interoperability-2 (accessed September 3, 2024).

[10] The Commission carefully considered the operational needs of Part 15 users and M-LMS licensees when it adopted Rule Section 90.353 in 1995, and it established technical limitations on M-LMS operations to minimize the potential for interference and provide a more conducive environment for sharing of the band by disparate services. Specifically, the Commission found that M-LMS licensees could provide protection and minimize interference to Part 15 devices by limiting duty cycle, pulse duration power, etc. The Commission viewed availability of additional testing data to Part 15 users as necessary for "fine tuning" of M-LMS system operations. *See,* Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, *Order on Reconsideration*, PR Docket No. 93-61, 11 FCC Red 16905 (1996)

The Commission has previously recognized that operational restrictions should be imposed on M-LMS licensees to allow the coexistence of the many varied users of the Lower 900 MHz Band, including the Part 15 and amateur communities.[11] The Commission also found that "unfettered interconnection and messaging in the LMS could not only increase the potential for harmful interference to other users of the band, but detract from the intended purpose of the LMS allocation." NextNav now proposes elimination of all relevant protections, including the restriction on unlimited interconnection. The Commission should not reverse course on its correct observation, or it will be largely dismantling a vital communications capability that benefits hundreds of millions of U.S. citizens.

We also seek comment on the status of any outreach with part 15 device users and amateur licensees.

To AICC's knowledge, NextNav has not shared studies, impact analyses, or communicated with any alarm industry participant in unlicensed spectrum. Instead, the NextNav Petition fails to make any type of showing – let alone one supported by field tests – demonstrating how its proposal would avoid causing unacceptable interference to Part 15 devices. AICC notes NextNav's indication (Petition p. 31) that "NextNav is completing technical analyses intended to address representative Lower 900 MHz Part 15 uses and will work with unlicensed users to understand their spectrum requirements." We are now nearly five months further down the road with no test results. Allowing the NextNav Petition to move forward for consideration before NextNav completes field testing and submits appropriate engineering studies into the record impermissibly shifts the evidentiary burden of proving that NextNav's proposal will avoid unacceptable interference to the Part 15 user community. Such a result would be arbitrary and capricious and contrary to the public interest. The Commission should require that testing be completed, and a full and detailed report submitted into the record; and the Commission should hold open the comment cycle in this proceeding until the affected users have had an adequate opportunity to review such test results and offer their own analysis. Moreover, the Commission should require that NextNav conduct field testing using the relevant Part 15 technologies, with participation of the device manufacturers.

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[11] *See* Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, *Report and Order*, 10 FCC Rcd 4695 (1995) ("*AVMS Report & Order")* at 4708.

C. The NextNav Proposal Will Cause Harmful Channel Crowding for Incumbent Users

As discussed above, interference considerations created by the NextNav proposal would likely force most if not all incumbent operations into a shared 900 MHz band that is almost 60% smaller than the current Lower 900 MHz band. AICC respectfully submits that this concentration of so many incumbents into such a small band of spectrum will lead to a potentially massive loss of valuable services to the public, and a stranding of billions of dollars of investment by manufacturers and consumers alike, as has been seen in the 2.4 GHz band: "The bottom line is that the 2.4GHz band has become overcrowded, resulting in interference, transmission disturbances and degraded wireless performance."[12]

This outcome would be adverse to the public interest. As discussed above, there are more than 100 million Z-Wave devices in the Lower 900 MHz band, as well as what is estimated to be tens of millions of spread spectrum devices (such as the alarm sensors made by DMP and other AICC members). In addition, there are numerous amateur radios and other types of incumbents. All of these devices would have to be crammed into what may be just 11 MHz of spectrum -- or less due to adjacent channel or desensitization interference caused by the side lobes of NextNav's high-powered transmissions using Part 27 out of band emissions. AICC, in consultation with its members, must conclude that this crowding will cause many devices to stop operating reliably, which could have life safety consequences for alarm systems. This crowding will be exacerbated by the growing concentration of devices using new technologies such as HaLow, which offers better speeds but requires more spectrum bandwidth.

D. The Costs Associated with NextNav's Proposal Weigh Against Approving the Plan

Address the costs and benefits involved in implementing the proposed band plan, including the impact on incumbents in terms of relocation or protection.

Can they be accommodated in other spectrum bands? What are the costs for relocation and how long would it take?

If a significant portion of the hundred million + Part 15 devices using the Lower 900 MHz Band are compromised due to interference or spectrum crowding as described above, the costs and detriments would be dramatic. First, loss of the use of many 900 MHz devices would disrupt the operation of the businesses, utilities, and government offices that rely on them. And importantly, consumers relying on such devices would be adversely affected. The costs would be multifaceted:

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[12] Unlocking the potential of wireless: navigating the overcrowded 2.4GHz band with Cognitive Coexistence - LumenRadio, May 27, 2024 (https://lumenradio.com/stories/unlocking-the-potential-of-wireless/).

1. **Cost of buying replacement devices or systems:** Any 900 MHz device that can no longer effectively function in the new environment is serving a function that will have to be replaced. It may be a consumer convenience, or it may be ensuring that a fire is detected. If the 900 MHz device is part of a more complex machine or system (such as an alarm system), the machine or system may have to be replaced. While certain individual consumer devices may not be expensive, when multiplied by millions of consumers that may be affected, the cost of replacement equipment becomes a significant factor in weighing the merits of the NextNav proposal. And of course, certain 900 MHz-reliant devices or systems are expensive.[13] Individual consumer devices are rarely purchased and installed in a vacuum. Rather, they are often part of an infrastructure of devices connected to a central hub or panel. If important connected devices are suddenly rendered inoperable, a consumer may be forced to replace the entire infrastructure to regain use of function. System integrators and platform developers might also be forced to undertake massive redesign efforts which require substantial research and development costs, as well as years of product testing to ensure compatibility.

2. **Cost of having replacement device installed/repaired:** Certain replacement consumer devices can be "self-installed". However, many replacements will require

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[13] Certain 900 MHz unlicensed mobiles are advertised as costing $429 each; and certain 900 MHz unlicensed call boxes are advertised as costing $509 each. *See* 900 MHz Two Way Radios (buytwowayradios.com) (https://www.buytwowayradios.com/guide/business/uhf/900-mhz-radios.html). Thus, if a small business needs to replace 100 mobiles, it could cost $42,900 for devices alone, a considerable expense for a smaller entity. Certain 900 MHz Lower Band mesh ethernet devices are advertised as costing $2,899 each. *See* 900 MHz Outdoor Rated Industrial Serial Radios (industrialnetworking.com)(https://www.industrialnetworking.com/Product-Category/Outdoor-900-MHz-Serial-Radios). If a business' entire mesh network must be replaced, consisting of *e.g.*, a hundred devices, the cost could run $289,000 for devices alone. For a larger company, the replacement equipment costs could easily run into the millions. Replacement of an entire 900 MHz Municipal SCADA (Supervisory Control & Data Acquisition) system could cost tens or hundreds of millions of dollars depending on the municipality.

expensive installation efforts by trained personnel, especially when the 900 MHz device is used as part of a larger system. For example:

a. *Alarm Systems*: A licensed and trained alarm technician is often required to replace 900 MHz devices that are part of an alarm system. The device will have to be correctly installed, or lives may be put at risk. Once installed, the technician must make sure that the device is communicating with the rest of the system, and that the system is once again functioning correctly. This process requires a "truck roll" and technician time that the alarm industry estimates to cost several hundred dollars in resources per visit. When multiplied by the number of affected customers, the overall cost is significant.

b. *Remote meter reading*: Utility companies increasingly rely on unlicensed wireless devices, often in the 900 MHz band, to engage in remote meter reading.[14] In addition, variations of these devices allow utilities to remotely turn off customer heat/air conditioning for short periods of time during peak demand, as a way to prevent "black outs" or "brown outs" and save the customers money (through their participation in "energy saver" programs whereby they agree to the remote control arrangement in exchange for discounted energy rates). Any 900 MHz meter reader or controller that stops functioning reliably will need to be replaced, and it will necessitate a truck roll by a trained utility technician. The cost of replacing millions of 900 MHz meter readers could be staggering. The Commission should investigate this impact in deciding on the impact of NextNav's proposal.

c. *Door openers*: If a garage door opener using 900 MHz fails due to interference or signal crowding, most consumers may have to buy a whole new unit (door lifting device and remote), since they generally cannot have their frequency changed.[15] Many consumers will need to have the new opener professionally installed. The average cost of a garage door opener installation is $378,[16] which is an undue burden on an individual consumer in an already difficult economy. Also, many ADA-compliant handicap automatic door openers utilize 900 MHz.[17] If millions of garage door openers and handicap door openers must be replaced or modified, the price tag could easily approach or surpass a billion dollars.[18] Again, the Commission should investigate this factor and consider its impact on the public interest balance in this proceeding.

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[14] See, e.g., https://www.neptunetg.com/globalassets/products/literature/spec-900mhz-amr_ami-03.15.pdf; https://www.digi.com/resources/documentation/digidocs/90001931/appendices/ert_technologies/ert_itron.html#:~:text=Encoder%20Receiver%20Transmitter%20(ERT)%20is,years%20on%20the%20integrated%20batteries ("Encoder Receiver Transmitter (ERT) is a 900MHz wireless technology developed by Itron to read meter data from Electric, Gas, and Water meters.").

[15] How to Change Frequency on Garage Door Opener | HGTV (https://www.hgtv.com/design/remodel/interior-remodel/change-frequency-garage-door-opener) ("So, your car's key fob, your Wi-Fi router and your lowly garage door opener are all operating on the same band of frequencies. All of that to say, you genuinely cannot change your garage door frequency, and it might be illegal if you did.")

3. **Intangible costs:** By far the greatest costs would be those associated with devices that protect the health and safety of the users: If a fire alarm fails because the 900 MHz sensor signal does not go through, the loss of life creates incalculable damages. If an elderly grandmother dies because of a loss of air conditioning on a 95-degree day, or heat in the middle of winter due to ineffective management of peak power demand, the loss is incalculable. If a patient becomes paralyzed because her medical monitoring device did not timely relay a deterioration in her condition, the loss is incalculable.

Another factor that weighs against the NextNav plan is that 900 MHz has proven vital to the unlicensed device ecosystem, because the 2.4 GHz spectrum is already crowded with Wi-Fi and video. “However, the 2.4GHz band is a crowded space, used not only by Wi-Fi but also Bluetooth devices and microwave ovens. It often suffers from congestion and interference, resulting in connectivity issues for smart home products – which may lead to tech support challenges and poor brand perception.”[19] Therefore, it is not a certainty that more than 100 million devices can be successfully migrated to 2.4 GHz or other unlicensed spectrum.

In summary, the NextNav plan would likely trigger the need to replace millions of devices, most of which are still well within their useful life, resulting in unduly burdensome costs that would be borne by consumers; loss of business and government productivity; a risk to life and property (for e.g., alarm devices and medical devices); and the setting of a precedent that industries investing tens or hundreds of billions of dollars in new technologies in reliance on FCC rules run the risk that they can suffer tremendous losses in time, money and competitiveness due to a rule change at the behest of one company.

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[16] How Much Does a Garage Door Opener Installation Cost? [2024 Data] | Angi (https://www.angi.com/articles/how-much-does-garage-door-opener-cost.htm)

[17] *See, e.g.*, 900 MHZ Wireless Family | BEA Sensors (https://us.beasensors.com/en/product/900-mhz-wireless-family)(“BEA’s 900 MHZ FAMILY compact transmitters and receiver allow wireless activation of any door control. FCC Part 15 certification ensures proper compliance with federal radio frequency regulations”).

[18] Most garage doors openers have an average lifespan of 10 to 15 years. *See* Extend the Lifespan of Your Garage Door Opener - Creative Door Services™ (https://creativedoor.com/blog/how-to-extend-your-garage-door-openers-lifespan) So it is likely that a large number of garage door openers will have to be replaced.

[19] *See*, “2.4 vs 5GHz: The science behind connectivity issues in IoT devices” RouteThis. July 12, 2023. https://blog.routethis.com/2.4-vs-5ghz-wifi-band.

The Commission has an obligation to consider meaningful protections for millions of Part 15 users of the Lower 900 MHz band who purchased home security systems that utilize the band, to ensure that they are fully compensated for their relocation costs and that they are provided with comparable facilities. As it currently stands, the NextNav Petition offers no such protections, and instead proposes to eliminate field testing requirements of Rule Section 90.353(d) that currently apply to M-LMS licensees. In the absence of meaningful and enforceable commitments to protect Part 15 users and equipment manufacturers, should the Commission decide to proceed with a rulemaking on the NextNav proposal, it would serve the public interest for it to require that NextNav pay for all costs associated with relocating or replacing any devices that cannot reasonably continue to operate in the Lower 900 MHz band.[20] As discussed below, such reimbursement was ordered in the reconfiguration of both the Private User 900 MHz band and the 800 MHz band, cited by NextNav as support for its proposal.

IV. Issues With and Alternatives for NextNav Proposal

What particular considerations support or mitigate against the use of the use of the Lower 900 MHz Band for a terrestrial PNT system, and should the Commission consider other bands for this purpose?

We seek comment on the costs and benefits of the proposal that the Commission designate NextNav as the nationwide licensee with rights to lease almost 10 megahertz of spectrum.

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[20] While Part 15 users are "secondary", they agreed to secondary status (and invested accordingly) under a very different set of rules and interference environment, which included reasonable interference testing and protection from LMS licensees.

A. NextNav Has Not Shown that its Proposed Dismantling of the Lower 900 MHz Band Will Succeed in Ensuring Nationwide PNT Service

A review of the NextNav Petition raises several questions about whether NextNav's proposed operation will be successful in creating a nationwide PRN/terrestrial GPS backup network. First, NextNav indicates that very little spectrum is needed to provide its PRN service; but that the bulk of the 10 MHz-wide downlink and 5 MHz-wide uplink it is requesting will go toward generating revenue from the use of the spectrum by large carriers for broadband service. This arrangement raises a number of concerns:

- Will this plan work? If it is not certain that the proposed network and financial arrangement with large carriers will succeed as hoped, then the dismantling of the Lower 900 MHz band, with all of the adverse effects described above, cannot be justified.

- How will the "lure" of excess capacity on NextNav's spectrum work? While NextNav hints at spectrum leases and/or MVNO arrangements with the largest carriers, are these carriers going to find it attractive to split a 10 MHz downlink with two or three of their competitors?

    - Will each carrier gain access to just 2.5 or 3 MHz of the spectrum? If each carrier is simply gaining access to spectrum through an MVNO, won't they have to conform their use of the spectrum for broadband and voice to NextNav's specifications and protocols? Most large carriers have their own specifications for spectrum use, and may not find such sharing attractive (especially since most large carriers prefer full control over their spectrum).

- What percentage of commercial mobile devices currently have the Lower 900 MHz Band programmed into them? Any devices that do not have the Lower 900 MHz Band already enabled will likely have to be replaced or modified, a negative for both the carriers and their customers.

- What will happen to NextNav's plan if one or more of the large carriers opt for another PNT option, such as Merlin TPS (discussed below) or one of the Low Earth Orbit (LEO) networks that offer greater power, building penetration and ability to penetrate urban canyons? Will NextNav's business plan fail, resulting in a failure of its nationwide PNT service?

  Why can't NextNav acquire or lease some of the abundance of commercial spectrum that the Commission has sold at auction over the last 15 years, much of

> which is still unbuilt? This option would not disrupt an existing group of services.[21]

Once the Lower 900 MHz Band is dismantled pursuant to NextNav's plan, it will be difficult to put it back together; and in any event, the substantial harm to consumers, businesses and government described above will have already happened.

B. Other GPS Backup Systems are Being Developed and/or Implemented that Would Not Adversely Impact Hundreds of Millions of Consumers as Well as Business and Government

In assessing the public interest justification for NextNav's proposal, the Commission must consider what other options can address the need NextNav seeks to address, especially those that will not be as disruptive as the NextNav plan.[22] In this regard, research indicates that a number of entities are already moving toward alternative PNT/GPS technologies.

1. Ongoing Research

Of note, nine different entities were recently funded by the US Department of Transportation (DOT) to research and develop back up technologies for GPS, utilizing four different classes of technology.[23] NextNav was only one of them. It will not be appropriate to dismantle the Lower 900 MHz band and displace countless users before it is known where the other eight funded projects stand, and what their impact may be.

At a higher level, the Defense Advanced Research Projects Agency (DARPA) has already been working on multiple ongoing efforts that look to replace GPS altogether, appearing to move away from a radio network approach that has inherent vulnerabilities (whether satellite-based or terrestrial). Programs in recent years have examined, among other things:[24]

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[21] Similarly, is it possible for NextNav to use or share some or all the 6 megahertz broadband channel in the Private User 900 MHz band for its operation? Again, NextNav says it only needs a small amount of spectrum to send PNT communications.

[22] An agency is required "to consider responsible alternatives to its chosen policy and to give a reasoned explanation for its rejection of such alternatives." *City of Brookings Mun. Tel. Co. v. FCC*, 822 F.2d 1153 at 1169 (quoting *Farmers Union Cent. Exch., Inc. v. Fed. Energy Regulatory Comm'n*, 734 F.2d 1486, 1511 (D.C. Cir. 1984)).

[23] U.S. Department of Transportation (2024, July 3) Department of Transportation Awards $7 million for Complementary Positioning, Navigation and Timing Technologies (https://www.transportation.gov/briefing-room/department-transportation-awards-7-million-complementary-positioning-navigation-and).

- **Adaptable Navigation Systems (ANS)** is developing new algorithms and architectures for rapid plug-and-play integration of PNT sensors across multiple platforms, with the intent to reduce development costs and shrink deployment time from months to days. ANS aims to create better inertial measurement devices by using cold-atom interferometry, which measures the relative acceleration and rotation of a cloud of atoms stored within a sensor. The goal is to leverage quantum physical properties to create extremely accurate inertial measurement devices that can operate for long periods without needing external data to determine time and position. Additionally, ANS seeks to exploit non-navigational electromagnetic signals—including commercial satellite, radio and television signals and even lightning strikes—to provide additional points of reference for PNT. In combination, these various sources are much more abundant and have stronger signals than GPS, and so could provide position information in both GPS-denied and GPS-degraded environments.

- **Microtechnology for Positioning, Navigation, and Timing (Micro-PNT)** leverages extreme miniaturization made possible by DARPA-developed micro-electromechanical systems (MEMS) technology. Micro-PNT comprises a portfolio of diverse efforts collectively devoted to developing highly stable and precise chip-scale gyroscopes, clocks and complete integrated timing and inertial measurement devices. DARPA researchers have fabricated a prototype with three gyroscopes, three accelerometers and a highly accurate master clock on a chip that fits easily on the face of a penny.

- **The Spatial, Temporal and Orientation Information in Contested Environments (STOIC)** program seeks to develop PNT systems that provide GPS-independent PNT with GPS-level timing in a contested environment. STOIC comprises three primary elements that when integrated have the potential to provide global PNT independent of GPS: long-range robust reference signals, ultra-stable tactical clocks, and multifunctional systems that provide PNT information between multiples users.

"In time, dependence on GPS may be as unimaginable as is the idea today of living without it."[25] DARPA's website indicates that PNT and navigation research and development projects are ongoing.[26]

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[24] Five next-generation technologies for positioning, navigation and timing, Phys.org, July 25, 2014 (https://phys.org/news/2014-07-next-generation-technologies-positioning.html)

[25] *Id.*

[26] NAVIGATION (darpa.mil)

In the meantime, other GPS backup technologies are already well underway:

2. LEO PNT

- "Reston, Virginia-based Satelles has been broadcasting timing and location signals since 2016 through a channel [on] Iridium's satellites in low Earth orbit previously used for paging. These signals are a thousand times more powerful than those from U.S.-based GPS satellites and other global navigation satellite systems (GNSS), Iridium CEO Matt Desch said during a media briefing. Stronger signals from space are better at penetrating walls for indoor coverage and are also less susceptible to being jammed or spoofed. Rising demand for more secure positioning, navigation, and timing (PNT) capabilities that can also serve as a backup for existing GNSS helped Satelles generate revenues in the low tens of millions of dollars in 2023, Desch said, and are set to become a major contributor to Iridium's bottom line in the coming years."[27]

- "Iridium has also recently announced plans to make its satellites compatible with 5G standards used by mass-market smartphones, staking its claim to a direct-to-device market that has attracted SpaceX and other established and startup satellite operators."[28]

- "Another company developing alternative GPS services is Xona Space Systems, a five-year-old Californian startup aiming to start building as many as 300 small PNT satellites by 2025."[29]

While the above GPS backup options are not terrestrial networks, they utilize LEO satellites. These satellites are significantly closer to earth, and therefore offer a much stronger signal that can better penetrate buildings and urban canyons than GPS.[30] These satellite systems are more difficult to jam; and it will be far more difficult for an adversary to shoot down as many as 300 LEO satellites (as opposed to 12 GPS satellites). The LEO network is also resistant to the Act of God damage that can be inflicted on a terrestrial system (e.g., floods, tornadoes, hurricanes, and wildfires). And of course, a terrestrial PNT system can be jammed and sabotaged as well.

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[27] Rainbow, J. (2024, March 4) *Iridium to take over GPS backup provider for $115 million*. SpaceNews. https://spacenews.com/iridium-to-take-over-gps-backup-provider-for-115-million/

[28] *Id.*

[29] *Id.*

[30] Satelles notes that LEO satellite broadcasts are much stronger than GPS satellites because they are 25 times closer to the Earth than GNSS satellites. *See* Satelles White Paper (2019) "Satellite Time & Location Signals 1,000 Times Stronger than GPS." https://satelles.com/wp-content/uploads/pdf/Satelles-White-Paper-2019.pdf (accessed September 3, 2024).

Researchers at the University of Texas at Austin believe that commercial broadband low-Earth-orbiting (LEO) satellites could, in addition to Internet service, provide a positioning, navigation, and timing (PNT) service far more robust to interference than traditional Global Navigation Satellite Systems (GNSS). This 2020 paper on "Fused LEO GNSS" proposes a high-performance, low-cost alternative which fuses the requirements of PNT service into the existing capabilities of the broadband satellite. The authors conclude that continuous assured PNT service over ±60° latitude (covering 99.8% of the world's population) with positioning performance exceeding traditional CPS would cost less than 2% of system capacity for the largest new constellations, such as SpaceX's Starlink or Amazon's Project Kuiper.[31]

The existence of these LEO GPS backup options is significant to the Commission's consideration of the NextNav Petition in two respects: First, the availability of their services allow the Commission the time to allow the different terrestrial GPS backup efforts to play out, including those options that will not cause disruption to the Lower 900 MHz band or other incumbent spectrum ecosystems. And second, the availability of the LEO services may undercut NextNav's business case, as described above. This factor militates against dismantling the Lower 900 MHz Band.

3. Existing Terrestrial PNT Service:

Merlin TNP is an existing company that is already offering a terrestrial alternative to GPS:

> MerlinTPS has tested its Terrestrial Positioning System (TPS) at the Department of Defense (DOD) PNT Assessment Exercises (PNTAX), demonstrating resilience against electromagnetic radio frequency interference. This test positions TPS as an alternative to GNSS-based systems in environments where GNSS is compromised or unavailable . . . PNTAX is designed to evaluate positioning, navigation and timing (PNT) technologies under conditions where traditional GPS signals are degraded or denied. MerlinTPS's system uses

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[31] P. A. Iannucci and T. E. Humphreys, "Economical Fused LEO GNSS," 2020 IEEE/ION Position, Location and Navigation Symposium (PLANS), Portland, OR, USA, 2020, pp. 426-443, doi: 10.1109/PLANS46316.2020.9110140. https://rnl.ae.utexas.edu/images/stories/files/papers/iannucci2020fused.pdf

> broadcast radio signals, which are less susceptible to jamming and spoofing than satellite signals, to provide positioning and timing data.[32]

Merlin TNP's service has been developed and tested with military applications in mind (as was the case with GPS). However, its website indicates that its PNT technology can be used in a variety of government and private sector contexts, such as critical infrastructure, mobile telecommunications, drones, connected autonomous vehicles and cybersecurity.[33] Thus, the Merlin technology appears to substantially overlap with the capabilities proposed by NextNav.

While AICC does not claim expertise regarding the above existing and proposed technologies, it is incumbent on the Commission to explore these alternatives in deciding upon the merits of NextNav's proposal. NextNav asks the Commission to pick winners and losers. As shown above, there are a number of competing, for-profit companies that are either working to develop PNT service, or are already providing it; and NextNav has not been able to demonstrate that its product will perform any better than its competitors. NextNav's most recent 10K filing with the Securities and Exchange Commission ("SEC") acknowledges "Our TerraPoiNT services have not been implemented for broad commercial use and there is no guarantee that TerraPoiNT services will be widely adopted. Further, there is no certainty that one of our competitors will not develop and commercialize a different solution in the meantime supplanting our market."[34] The existence of MerlinTPS as a competitor could derail NextNav's business plan and cause its 900 MHz PNT system to fail, as discussed above. Again, this weighs against allowing the dismantling of the successful and heavily used Lower 900 MHz ecosystem.

In any event, by granting such an enormous windfall to one competitor, the Commission could discourage the innovation and competition needed to create the best product at the best price for all public and private users of a PNT service.

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[32] GPS World, April 23, 2024, MerlinTPS advances GNSS-independent positioning - GPS World : GPS World (https://www.gpsworld.com/merlintps-advances-gnss-independent-positioning/)

[33] MerlinTPS Corp., Where We Work, (Retrieved from https://merlintps.com/where-we-work/).

[34] NextNav, Inc. (13 Mar. 2024). *Form 10-K 2023* at p.18. Retrieved from SEC EDGAR website http://www.sec.gov/edgar.shtml.

C. NextNav's Proposal Does Not Address What Appears to be the Simplest and Most Effective Alternative for a Terrestrial GPS Backup

It does not appear that NextNav has explored the most obvious and potentially workable solution for deployment of its nationwide PNT service: Make a financial arrangement to install its PNT technology into the nationwide network of each major wireless carrier, utilizing that carrier's spectrum. NextNav indicates that it only needs a small portion of the proposed 10 MHz downlink for its PNT service; and concedes that the vast majority of the 15 MHz license it is requesting is to lure large wireless carriers to use NextNav's PNT service, and to raise revenues for building out the PNT network. However, the simplest path would seem to be having the carrier provide a small amount of its own spectrum on which PNT could operate. This would allow use of the carrier's existing network, spectrum, towers, antennas, backhaul, etc. NextNav confirms in its Petition (at pp. A-2, A-3) that each wireless carrier depends on reliable timing synchronization to operate its system, and that NextNav has developed a scalable and economical synchronization technique that is orders of magnitude more precise than what could be implemented into an NR network to enable a robust and accurate PNT service. Therefore, incorporating PNT into the carrier's network directly, using the carrier's spectrum, would be a symbiotic relationship that should avoid most of the buildout expense that NextNav feels compelled to fund by shrinking the Lower 900 MHz Band. The wireless carriers' need for reliable PNT would seem to be adequate incentive for them to enter into such relationships with NextNav.

Indeed, NextNav may be able to accomplish most or all of its goals if it can reach such arrangement with just one wireless operation, the AT&T/FirstNet network. With AT&T's help, FirstNet has built out a nationwide system that has better coverage than most commercial networks (because of FirstNet's obligation to ensure coverage to first responders, even in remote areas). The FirstNet system has been built with a "hardened" design, to better avoid outages due to disasters or sabotage. And FirstNet's 700 MHz spectrum has better propagation characteristics than the 900 MHz spectrum. While FirstNet's focus is on providing communications capabilities to public safety personnel, it actively seeks relationships with private sector users so as to generate revenues to maintain the network. And a relationship with

FirstNet gives the user access to AT&T's network as well. It appears that NextNav followed this path in deploying its z-axis technology.[35]

Whether with FirstNet or with multiple nationwide carriers, the type of relationship described above would speed deployment, minimize deployment costs, and incorporate NextNav's technology directly into the networks of those entities that perhaps need PNT the most. It would also avoid any issue with devices that may not have the Lower 900 MHz band programmed into the unit. In this regard, embedding NextNav's technology directly into the existing carrier's systems, using exclusive, licensed spectrum, would appear to avoid NextNav's stated concern that "driving adoption into user devices would be difficult if PNT-specific protocols (i.e., non-3GPP standards) are used."[36] Wireless carriers provide a wide range of data-only services to various users, including location-based services such as telematics for e.g., OnStar. PNT would seem to fall into a similar category.[37]

Industry publications have described arrangements similar to what is described above, whereby a technology proponent has incorporated its technology into a wireless carrier's spectrum, rather than seeking to set up its own separate network.[38] By entering into such arrangement, NextNav could accomplish its PNT goals without causing substantial disruption and loss of service to Lower 900 MHz Band users.

V. Precedent Cited by NextNav Does Not Support Creation of a Nationwide License Outside of the Competitive Bidding Process

NextNav cites to the Commission's action in revising the portion of the 900 MHz band designated for narrowband land mobile radio communications by Business/Industrial/Land Transportation (B/ILT) Pool licensees and Specialized Mobile Radio (SMR) providers (896-

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[35] *NextNav Petition* at p.16.

[36] *Id.* at p. 22.

[37] If NextNav enters into a direct relationship with one or more wireless carriers to use their network and spectrum, NextNav could consider selling its remaining 900 MHz licenses to gain funds for its operation.

[38] AT&T and Verizon have their own partnerships with AST SpaceMobile to provide 100 percent coverage across North America. The carriers will share with AST SpaceMobile a portion of their respective bands of 850 MHz low-band spectrum. *See* "*AST SpaceMobile partners with AT&T, Verizon on broadband coverage*." Light Reading, Informa PLC. July 1, 2024, https://www.lightreading.com/satellite/ast-spacemobile-partners-with-at-t-verizon-on-broadband-coverage.

901/935-940 MHz) (the "Private User 900 MHz Band") as precedent for the Commission moving forward with its rebanding proposal. However, the FCC was not faced with adversely impacting a large and diverse community of Part 15 users when reconfiguring the Private User 900 MHz band.[39] As a result, the public interest considerations are significantly different. The Commission found that the Private User 900 MHz Band was not heavily used in rural areas of many states, while the Lower 900 MHz band has widespread use by Part 15 users in every state, in both rural and urban areas.

To protect incumbent operators, a negotiation-based mechanism was created to transition the Private User 900 MHz Band on a county-by-county basis from interleaved SMR and B/ILT blocks to one broadband and two narrowband segments.[40] In contrast, the NextNav proposal would eliminate current field testing requirements of Rule Section 90.353(d) and offer no protection to incumbent Part 15 users. Where a 900 MHz broadband licensee was permitted to relocate incumbent narrowband operators mandatorily, the rules required payment of the incumbent's reasonable relocation costs including provision of comparable facilities.[41] The NextNav proposal offers no such reimbursement of displaced incumbent Part 15 users. Other distinguishing factors include:

- The Commission found that the transition of the Private User 900 MHz Band to broadband would create opportunities for many 900 MHz licensees, whereas the NextNav proposal would privatize a currently shared spectrum resource for the benefit of one licensee.

- The Private User 900 MHz Band rebanding process allows different results to be reached in different markets resulting in acquisition, relocation or protection of incumbents. The NextNav proposal mandates a single result nationwide without any compensation or protection.

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[39] *See, Review of the Commission's Rules Governing the 896-901/935-940 MHz Band*, Report and Order, Order of Proposed Modification, and Orders, 35 FCC Rcd 5183 (2020) ("*900 MHz R&O*").

[40] *900 MHz R&O* at Para. 20.

[41] *900 MHz R&O* at Para. 21.

- The negotiation-based transition of the Private User 900 MHz Band allowed certain larger incumbents to be exempt from mandatory relocation, while the NextNav proposal would not exempt any Lower 900 MHz Band users.

NextNav also points to the Commission's 800 MHz/1.9 GHz modernization proceeding as a further basis for allowing Lower 900 MHz Band restructuring and relicensing to proceed outside of the auction requirements of Section 309(j) of the Communications Act. Petition at p. 34. But again, as with the Commission's restructuring of the Private User 900 MHz Band, the 800 MHz/1.9 GHz modernization proceeding involved public interest considerations that were very different than the Lower 900 MHz Band.

The 800 MHz/1.9 GHz modernization proceeding was undertaken as a way to eliminate harmful RF interference caused by an incompatible mix of communications systems in the 800 MHz Band, including public safety 800 MHz systems.[42] Part 15 operations in the Lower 900 MHz Band currently co-exist with LMS and M-LMS operations, as well as other authorized users of the band, without any significant issues. If the NextNav proposal were to move forward, this would significantly increase the likelihood of harmful interference to Lower 900 MHz Band users, as discussed above.

Nextel worked closely with public safety organizations in developing a plan that would solve the 800 MHz band public safety interference problem.[43] In contrast, AICC is not aware that NextNav has made any effort to reach out to safety and security related Part 15 users (like the alarm industry), let alone other unlicensed users or equipment manufacturers.

Following the company's initial offer of $850 million for retuning and preplacement expenses, the Commission ultimately required Nextel to guarantee reimbursement for all costs of band reconfiguration by means of an irrevocable letter of credit in the amount of $2.5 billion.[44]

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[42] *See, Improving Public Safety Communications in the 800 MHz Band et al.*, Report and Order et al., 19 FCC Rcd 14969 (2004) ("*800 MHz/1.9 GHz Swap R&O*")

[43] The Commission's 800 MHz plan incorporated essential elements of a proposal developed by Nextel, major public safety organizations, and various private wireless organizations (the so-called "Consensus Parties"). *800 MHz/1.9 GHz Swap R&O* at Para. 4, Note 13.

[44] *800 MHz/1.9 GHz Swap R&O* at Para. 30.

Again, NextNav has made no attempt to calculate potential relocation costs and it has made no reimbursement offer to incumbent Part 15 users in the Lower 900 MHz Band.

The 1910-1915/1990-1995 MHz band segment was granted to Nextel as part of the rebranding. In conjunction with this grant, Nextel agreed to relocate Incumbent microwave operations from the 1910-1930 MHz band segment where its operations in the 1910-1915 MHz band would cause harmful interference, and to commit to funding the entire cost of relocating all BAS incumbents nationwide from the 1990-2025 MHz band.[45] NextNav's proposal makes no offer to pay relocation expenses of Part 15 operations in the Lower 900 MHz Band.

VI. Section 309(j) of the Communications Act Requires the FCC to Conduct a Competitive Application Process or to Otherwise Recover Value of Public Spectrum Used for a New TPNT Service

Finally, we seek comment on the windfall that NextNav might receive as a result of its proposed spectrum swap for a new nationwide license, including the acquisition of accompanying rights as a licensee and lessor, the application of flexible use and less restrictive technical rules to this band, and how the Commission should address any such windfall.

NextNav proposes a spectrum "swap" to trade its current M-LMS holdings for a single, nationwide 15-megahertz flexible use license. It is respectfully submitted that the proposed arrangement is not a true "swap." NextNav would end up with a primary status license allowing operations using full macro power limits and standard out-of-band emissions limits; and that would eliminate restrictions on real-time interconnection obligations, services that may be provided, and the amount of M-LMS spectrum that a licensee may hold. Thus, NextNav would receive more spectrum in a larger geographic area than currently held, with far greater operating privileges. More importantly, NextNav also proposes that it be granted relief from rules that were adopted to facilitate the co-existence of M-LMS operations and Part 15 devices in the 902-928 MHz band. As a result, all other entities that are currently sharing the 26 MHz-wide Lower 900 MHz Band with NextNav will be reduced to just 11 MHz of spectrum – and more likely just 9

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[45] *800 MHz/1.9 GHz Swap R&O* at Para. 252.

MHz of spectrum due to the sidelobe interference considerations discussed above. In effect, NextNav is proposing a de facto privatization of the lion's share of the Lower 900 MHz band.

To assemble the spectrum that it hopes to trade for a nationwide broadband license, NextNav says it holds approximately 64% of all M-LMS B- and C-Block, and that it seeks to acquire all active M-LMS A-Block licenses (*i.e.,*, 128 A-Block licenses currently held by Telesaurus) and to have the Commission reinstate 129 additional licenses that were terminated in 2017 for failure to meet an interim construction deadline.[46] The terminated licenses were first issued in 1999 and 2001,[47] and the construction deadlines had been extended numerous times from original deadlines in 2004 and 2006.[48] Thus, in addition to securing primary status and significantly increased operational flexibility in the Lower 900 MHz band, NextNav wants to "revive" licenses that would otherwise be returned to the FCC's spectrum inventory and made available for competing applicants. This raises real questions about a potential windfall for NextNav that the Commission would need to explore carefully. To the extent there are mutual exclusive applications, the Commission has an obligation under Section 309(j) of the Communications Act to make the licenses (or a single nationwide license) available for auction.[49]

If the Commission should determine that an auction or other competitive filing procedure is not feasible for the additional Lower 900 MHz Band spectrum and expanded rights that NextNav seeks for its commercial broadband offering and new TPNT service, it appears that the Commission must recover the value of the spectrum pursuant to Section 309(j)(13) of the Act.[50] This statutory provision was created in the context of the "Pioneer's Preference" program, which rewarded entities seeking to applicants that "make significant contributions to the development of a new telecommunications service or technology". While the Balanced Budget Act of 1997[51] terminated the FCC's pioneer's preference program, the language of Section 309(j)(13) remains part of the Communications Act (and thus cannot be waived by the Commission). This provision expresses the intent of Congress that the FCC should not award licenses for a valuable public resource without recovering for the public a significant portion of the value of these licenses – even when the applicant seeks to "make significant contributions to the development of a new telecommunications service or technology".

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[46] In re Helen Wong-Armijo, FCR, Inc., Skybridge Spectrum Foundation, & Telesaurus Holdings GB, LLC, *Report & Order*, 32 FCC Rcd 9458 (2017) at 9475-76.

[47] *Id*. 32 FCC Rcd at 9461.

[48] *Id*. at 9461-63.

[49] *See* 47 U.S.C. § 309(j)

[50] *See* 47 U.S.C. § 309(j)(13)

[51] *See* Balanced Budget Act of 1997, Pub.L. No. 105-33, § 3002(a)(1)(F), 111 Stat. 251, 259 (1997) (*amending* 47 U.S.C. § 309(j)(13)(F)).

In essence, the NextNav Petition seeks preferential treatment in the FCC's licensing processes on the basis that it has developed a new communications service and technology (*i.e.*, the NextGen terrestrial PNT system). Thus, its request is in the nature of a Pioneer's Preference request; and in any event, Section 309(j)(13)(B) of the Act appears to be the only statutory provision in the Act that addresses how the Commission should process an application for valuable commercial spectrum without a competitive application process. Section 309(j)(13)(B) provides that the Commission "shall recover for the public a portion of the value of the public spectrum resource made available."[52] The amount to be paid as a condition for receiving the license would be determined by the Commission on the basis of an average per-POP price for "licenses that the Commission determines are most reasonably comparable in terms of bandwidth, scope of service area, usage restrictions, and other characteristics of the license awarded," minus a 15% discount.[53] In this instance, there are reasonable indications that a nationwide 15-MHz low band 5G license with primary status would likely fetch billions in a competitive market:

> And NextNav isn't the only company working to introduce new communications services into the 900MHz band. Anterix, Ondas Networks and a variety of other companies are also eyeing the spectrum band for various communications services. . . . As a result, such spectrum holdings can be very valuable. For example, T-Mobile *is expected to begin selling a 13.5MHz slice of spectrum in the nearby 800MHz band for $3.6 billion or more*.[54]

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[52] *See* 47 U.S.C. § 309(j)(13)(B)

[53] *Id.*

[54] Dano, M., (2024, April 16) *NextNav, Anterix, Ondas join rush toward 900MHz opportunities*. LightReading, Informa PLC https://www.lightreading.com/private-networks/nextnav-anterix-ondas-join-rush-toward-900mhz-opportunities *(Emphasis added).*

What performance requirements would be necessary, considering the proposed operations, to ensure intensive use of the spectrum, and thereby fulfill the Commission's obligations under the Act?

Since NextNav is looking for a license featuring parity with the Part 27 rules and would be awarded stewardship of an extremely valuable public asset, the license should be subject to the Part 27 rules requiring construction benchmarks, license renewal requirements, and compliance with the 180-day discontinuance of service rule. If these requirements are not met, the license should automatically terminate.

CONCLUSION

For the reasons set forth above, the Commission should not grant NextNav's Petition, since it would be adverse to the public interest, would create threats to public safety, and on balance would cause unreasonable harms to government and business operations, while also imposing unfair burdens on tens if not hundreds of millions of consumers. Its business plan (to accomplish its buildout by relying on spectrum leasing and/or MVNO arrangements with large wireless carriers) is speculative at best and may fail if at any time one or more carriers find the arrangement unattractive or decide to switch to one of the other PNT technology providers that are emerging. If such failure occurs, the Commission will have dismantled a very successful Lower 900 MHz band for nothing.

As shown above, the impact on the alarm industry could put lives at risk; and the impact on other 900 MHz devices could impose a costly burden on consumers, government and private sector alike. While the FCC has a role to play in regulating communications services, the Commission has recognized that its role with respect to the introduction of new communications technologies is to let the marketplace, not the government, pick winners and losers.[55] The Commission should not ignore this common sense regulatory approach when the stakes are so high.

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[55] *See, e.g.*, Oxman, Jason "The FCC and the Unregulation of the Internet" (OPP Working Paper No. 31) (1999) at p. 24. Available at: https://www.fcc.gov/reports-research/working-papers/fcc-and-unregulation-internet

Respectfully submitted,

ALARM INDUSTRY
COMMUNICATIONS COMMITTEE

By: Sascha Kylau
Sascha Kylau
Tiffany Galarza
Co-Chairs

/s/ John A. Prendergast
John A. Prendergast
D. Cary Mitchell
Its Attorneys

Blooston, Mordkofsky, Dickens,
Duffy & Prendergast, LLP
2120 L Street, N.W., Suite 825
Washington, DC 20037
Tel. (202) 659-0830

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